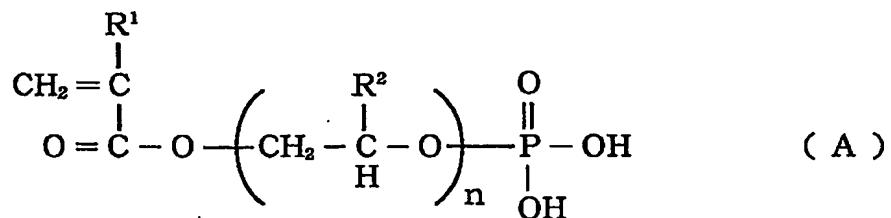


CLAIMS

1. An electrolyte membrane comprising a siloxane-based polymer, wherein the siloxane-based 5 polymer is obtained by vinyl polymerization of a silane compound having (meth)acrylate functional group or a hydrolysis product thereof and a (meth)acrylate compound having a phosphate group followed by siloxane crosslinking.

10 2. The electrolyte membrane according to claim 1, wherein said hydrolysis product is obtained by hydrolysis/polycondensation of a methylalkoxysilane and a (meth)acrylate compound having an alkoxy silyl group.

15 3. The electrolyte membrane according to claim 1, wherein said (meth)acrylate compound having a phosphate group is a compound represented by the following general formula (A) :



20 wherein R¹ represents H or CH₃; R² represents H, CH₃ or CH₂Cl; and n represents an integer from 1 to 10.

4. The electrolyte membrane according to claim 1, wherein the membrane is hardened with a hardening

agent or a siloxane crosslinking component.

5. A solid polymer fuel cell comprising an electrolyte membrane of a siloxane-based polymer according to claim 1.

5 6. A method for producing an electrolyte membrane comprising a phosphate-containing siloxane-based polymer, the method comprising the steps of:

providing an silane compound having (meth)acrylate functional group, and a (meth)acrylate 10 compound having a phosphate group;

carrying out hydrolysis-polymerization of the silane compound to form a siloxane polymer having (meth)acrylate functional groups;

carrying out vinyl polymerization with the 15 siloxane polymer and the (meth)acrylate compound having a phosphate group to obtain a siloxane-based polymer;

forming a membrane from the siloxane-based polymer; and

20 crosslinking the siloxane-based polymer.

7. A method for producing an electrolyte membrane comprising a phosphate-containing siloxane-based polymer, the method comprising the steps of:

providing a silane compound having a 25 (meth)acrylate functional group, and a (meth)acrylate compound having a phosphate group;

carrying out vinyl polymerization with the

silane compound and the (meth)acrylate compound having a phosphate group to form a vinyl polymer having a group derived from the silane compound;

carrying out hydrolysis-polymerization of the

5 silane compound-derived groups to obtain a phosphate-containing siloxane-based polymer;

forming a membrane of the siloxane-based polymer; and

crosslinking the siloxane-based polymer.